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Your attention is invited

NEWS OF THE SANITARY ENGINEERING DIVISION OF ASCE

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PROCEEDINGS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

DIVISION ACTIVITIES

SANITARY ENGINEERING DIVISION

Proceedings of the American Society of Civil Engineers

NEWS

September, 1958

MANUAL ON INCINERATOR DESIGN

The July issue of the News Section of the Journal contained an announcement relative to the publication of Municipal Incinerator Design, a Survey of Engineering Practices, prepared by the Solid Wastes Engineering Section, Committee on Sanitary Engineering Research, ASCE, in cooperation with the Public Health Service. The booklet referred to is available from the General Engineering Program, Division of Sanitary Engineering Services, Bureau of State Services, Public Health Service, Dept. H.E.W., Washington, D. C.

An identical report was published as SED Research Report No. 18 in the June, 1958, issue of the Journal as Proceedings Paper 1677. Additional copies of this paper can be obtained from ASCE in the same manner as for other Proceedings Papers.

DID YOU KNOW THAT

While Only 8 per cent of the membership of ASCE belong to the Sanitary Engineering Division, they represent approximately 60 per cent of the sanitary engineer population. From this it can be concluded that the majority of sanitary engineers have sought professional affiliation with ASCE. As Society members, their professional journal is the Journal of the Sanitary Engineering Division. More than any other publication its pages reflect the stature of the Profession.

Seth G. Hess, Director and Chief Engineer of the Interstate Sanitation Commission, died on June 18. As operative head of the Commission, Mr. Hess worked with fifteen commissioners, five each from New York, New Jersey and Connecticut.

Walter Lyon has been appointed director of the Pennsylvania State Health Department's Division of Sanitary Engineering. A graduate of Johns Hopkins University from which he received a bachelor's degree in civil engineering in 1947 and a master's degree in sanitary engineering the following year. Mr. Lyon previously served with the U. S. Army in Japan, the Washington Suburban Sanitary Commission, Maryland State Department of Health, and the Public

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Health Service prior to joining the Philadelphia State Department of Health. The Division is the investigatory and enforcement agency of the State Sanitary Water Board which administers the state's clean streams program.

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SANITARY ENGINEERING RESEARCH

PUBLIC WORKS MAGAZINE REPORTS ON SANITARY ENGINEERING RESEARCH

Any sanitary engineers who have not already seen the December, 1957, issue of Public Works and read its report on "Highlights of Research in Sanitary Engineering," should do so at first opportunity.

In an introduction to the article Dr. D. A. Okun, University of North Carolina, stated that its purpose is to illustrate the variety of agencies, topics and professional skills involved in sanitary engineering research. He pointed out that the first step in meeting each problem created by the increasing complexity of our environment is research and that sanitary engineers must help direct men and money into research activities.

Contributors to this research issue were selected so as to illustrate the diversity of projects and supporting institutions and agencies responsible for research activities in the sanitary engineering field.

SYRACUSE UNIVERSITY RECEIVES RESEARCH GRANT

A grant of $20,000 from the New York State Health Department has been awarded Syracuse University's Department of Civil Engineering to conduct research on accelerated sewage oxidation ponds. The purpose of the study will be to discover the effectiveness of sewage oxidation ponds with various designs under New York State climate conditions. The one-year project will be co-directed by Dr. N. L. Nemerow and Prof. J. J. Hennigan, Jr., of the Department of Civil Engineering.

RESEARCH PROGRAM AT PENNSYLVANIA STATE UNIVERSITY

The sanitary engineering laboratory at Pennsylvania State University is well equipped for chemical and bacteriological analyses of water and sewage. At present, it comprises one large room adjacent to the Hydraulics Laboratory, and the latter can be used for sanitary engineering studies when appropriate to the type of project concerned.

Next year, it is planned—through remodeling—to add approximately 150 per cent more laboratory space to the present area. This addition will include a graduate-research area, a "warm lab" for radioactive tracer work, a walk-in incubator, and an equipment storage room.

Special research projects have been located in other separate rooms, or in remote areas of the campus, as required to expedite this work. The University has just completed a 2.8 mgd. sewage treatment plant, and this can be used for instruction and limited investigations.

The two research projects which are presently under way are described as follows:

Continuous Total Bio-Oxidation of Skim Milk Solids

The object of this project is to determine the metabolism of the skim milk solids with reference to the process units and the time involved without the removal of any activated sludge solids from the system.

Experimental equipment consists of:

1. Six oxidation tanks having a capacity of 60 gallons each, operating in series.
2. A concentrated skim milk solids solution (continuous feed, controlled rate) which can be admitted to any of the six aeration tanks.
3. A gravity separation clarifier to concentrate sludge and return it to the system.
4. A pump sump to permit recycling the concentrated sludge through the oxidation tanks.

Controls are provided to permit varying the temperature, air supply rate, recycling rate, sludge return rate, and skim milk solids feed rate. It is also possible to eliminate any number of oxidation tanks from the system cycle.

The first phase will study the substrate removal and oxygen metabolism as a function of the point of addition of the skim milk solids in the aeration tank series. The second phase involves the elimination of the oxidation tanks, one by one, until the minimum recycle time is determined.

Metabolism of Bio-Oxidation of Sodium Cyanide

The object of this investigation is to determine assimilation rates and capacities of an acclimated activated sludge for sodium cyanide. It is hoped that a micro-flora can be developed which will be able to exist on sodium cyanide as its only source of energy.

The starting flora is activated sludge developed from domestic sewage to which increasing amounts of sodium cyanide will be added along with decreasing amounts of sewage until no sewage is required.

It is planned to analyze the substrate and excess waste air for cyanide and carbon dioxide. The three-liter, continuously-fed, oxidation cells are maintained at constant temperature values in a water bath.

RESEARCH PROGRAM AT WASHINGTON STATE INSTITUTE OF TECHNOLOGY

The Washington State Institute of Technology at the State College of Washington includes the College of Engineering and Mineral Technology and the Division of Industrial Research. The Engineering Experiment Station and the Mining Experiment Station are sections within the Division of Industrial Research.

The Division of Industrial Research has its own laboratories and full-time staff. Many of its sections operate independently of the academic departments. This is particularly true of the Hydraulics Section, which has a large model laboratory and a staff entirely separate from the civil engineering department. On the other hand, the Sanitary Engineering Section is very closely integrated, using the same laboratories, equipment and—to a large extent—the same staff.

Reasonably adequate research space is available in the Engineering Laboratory Building. This includes instructional, bacteriological and chemical laboratories. The chemical laboratory provides some space for small pilot plant operations. Two small supplementary laboratories provide space for

radiological equipment and instrumental analysis—spectrophotometer, filter photometer, etc.

Research investigations recently completed or presently under way are as follows:

Cannery Waste Disposal

A major problem in Washington has been the pollution of streams from food canning plant wastes. The canning of peas produces a particularly potent waste and this problem has been studied at a cannery in southwestern Washington for several years. An in-plant survey was made in 1952 for the determination of waste quantities and strengths arising from the various processing operations. Following this preliminary study, two projects were initiated for the investigation of waste treatment methods most applicable to the treatment of the blancher overflow—the most concentrated waste produced in the pea canning operation.

These projects involved studies of the treatment of this waste by high-rate trickling filters and by anaerobic digestion. Treatment efficiencies, optimum feed rates and operating conditions were determined for both processes. The latter study was expanded to include experimentation in the thermophilic temperature range. Operational problems were defined and interpreted in terms of full-scale applications of these waste treatment processes.

A third study has been devoted to determining whether spray irrigation of cannery wastes on alfalfa and green pasture was practical. The data resulting from these studies provided operational information in terms of maximum waste strengths and application rates for the successful application of this waste disposal practice.

Slime Growth

During the summer of 1957, the problem of slime growth in irrigation water derived from cannery effluent came under study. This problem is particularly acute during the pea canning season, because of the high carbohydrate content of the wastes. The slime growth is reported to cause clogging of irrigation gates, odors, and so forth, causing some farmers to seriously object to using the water and allowing wastes to be discharged to tributary streams. Studies to date involved identification of causative organisms and the development of means for their control.

Other Projects

Other research projects include the separation and identification of the various volatile acids in digester supernatant at varying loadings by column chromotography, trickling filter studies, and the collection of data on the operation of oxidation ponds.

* * *

WATER SUPPLY AND WATER POLLUTION CONTROL

FLUORIDATION IN GREAT BRITAIN

Opposition to the fluoridation of public water supplies persists in spite of the overwhelming scientific evidence in support of this important public health measure. To those who have assisted the physician and dentist in support of

fluoridation programs it might be of some satisfaction to realize that their problems are not unique and are shared by fellow professionals throughout the world. The following editorial from the English News Chronicle appeared in a recent issue of the Journal of the British Water Works Association:

> "Extraordinary passions have been aroused over the effect of water on dental decay. Fluoridation—by which a chemical is added in minute quantities to our water supply—has been approved by the World Health Organization as "an effective, safe and practicable means of preventing tooth decay." Yet there is still opposition.
>
> The main argument is based on principle: it is morally wrong, say opponents of the system, for the authorities to tamper with the water supply.
>
> Facts made known today fully confirm the case for fluoridation. For 12 years 17 countries have used it, so it is hardly a dangerous novelty. And dental decay is increasing in Britain.
>
> Is this really a case of the authorities "tampering" with a commodity for which there is no alternative choice? Certain freedoms are sacred, but this is not one of them. When whole areas are freed of the mosquito to put down malaria it can hardly be called abuse of freedom. It is usually called progress.
>
> There can no longer be any doubt about the benefits of fluoridation—or of the need of it. The time has come for those who protest against it to go into voluntary liquidation."
>
> - News Chronicle, 19th March, 1958

NEW RIVERS AND HARBORS PUBLIC WORKS BILL PROVIDES FOR MUNICIPAL AND INDUSTRIAL WATER SUPPLY NEEDS

Public Law 500, 85th Congress, which was signed by the President on July 3, contained an important new section in addition to the usual authorization for the construction of public works on rivers and harbors for navigation, flood control, and other purposes.

Title III of this Act provides authority for the Corps of Engineers and the Bureau of Reclamation to include storage for immediate and future water supply in Federal navigation, flood control, irrigation, or multiple-purpose projects on a basis which will permit the Federal Government and local interests to share equitably in the benefits of multiple-purpose construction. This title also provides that storage may be included in any reservoir project surveyed, planned, constructed or to be planned, surveyed and/or constructed by these agencies.

The Senate Committee on Public Works believes that Title III prescribes a sound division of water supply responsibility between the Federal Government and States and local interests by declaring it to be the policy of Congress to recognize the primary responsibilities of the States and local interests in developing water supplies for domestic, municipal, industrial, and other purposes and that the Federal Government should participate and cooperate with States and local interests in developing such water supplies in connection with the construction, maintenance, and operation of Federal navigation, flood control, irrigation, and multiple-purpose projects.

Title III is considered by the Committee to be one of the most important parts of the bill because of the increasingly acute water shortages which are

developing not only in the more arid sections of the country but also in humid areas.

It is the opinion of the Senate Committee on Public Works that Title III provides a framework within which the Corps of Engineers and the Bureau of Reclamation may proceed to develop the best overall use of water resources in river basins in the service of water supply and other needs. While it is true that water supply storage may be provided under certain conditions under existing law, Title III makes possible provision of water-supply storage in reservoirs where it is apparent that there will be a future demand for such storage but where the demand is not pressing at the time of construction. Arrangements are made for deferral of initial repayment of costs allocated to water-supply storage until storage is first used for this purpose and for final repayment of such costs within the life of the project and not to exceed 50 years from the date of first used for water supply. An interest-free period of up to 10 years will be allowed. The interest of the Federal Government is protected by the requirement that prior to initiation of construction or modification of a project including water-supply provisions, State or local interests shall agree to pay for the cost of such provisions on a basis permitting sharing of the benefits of multiple-purpose construction between all authorized project purposes, and the requirement that in the case of water-supply storage for future demands State or local interests give reasonable assurances that they will contract for use of such storage on a basis permitting paying out the costs allocated to water supply within the times specified.

The Committee intended that, where possible and without interference with the purpose of existing plans or projects under construction, the agencies should approve capacity allocations for municipal and industrial water supplies.

That portion of Title III which deals with future water supplies will be applied as follows:

1. It is expected that when a portion of such capacity is first utilized then repayment for that portion will be started and repaid within the life of the project, but not to exceed 50 years.
2. The portion of such capacity which is allocated to future use or demands would require no payments for 10 years. After 10 years interest payments would be made and repayment of principal would not be required until the reserved future capacity is first used. When use is first made of any portion of the capacity reserved for future use, then payment would be made on both the interest and principal component. The total cost allocated to future water supply would be repaid within a period not to exceed 50 years, including the 10-year interest-free period.

PROGRESS OF PUBLIC HEALTH SERVICE WATER QUALITY BASIC DATA PROGRAM

Since the first progress report of February 5, 1958, the program has activated 8 more water quality stations, making a total of 47 stations now participating in the network.

The first Analytical Reference Service samples covering mineral analyses were distributed to 20 laboratories on January 6. Results were received from 18 laboratories. With minor exceptions, the performance of the individual

laboratories was excellent. A report on the results has been prepared and distributed. The second reference sample was distributed April 4 to another group of 20 laboratories. Results have been received and a report is being prepared.

A reference sample covering the "demand analyses" (BOD, COD, chlorine demand, and ammonia) is now being developed and should be ready for distribution soon.

PENNSYLVANIA AUTHORIZES FIRST MUNICIPAL SEWAGE LAGOON

The first "lagoon" system for sewage disposal ever authorized in Pennsylvania has received plan approval and authorization of construction from the Sanitary Water Board of the State Department of Health. This system will serve a housing development in Hampton Township, Allegheny County. The Sanitary Water Board has approved the system only as an interim method of treatment and requires that proof of efficiency and adequacy of the treatment works shall be furnished to the Board at the end of one year. The subdivision developer has deposited $22,500 in escrow for two years to guarantee the satisfactory operation of the plant or to pay the cost of a substitute conventional plant if the lagoons do not meet Board requirements. No further applications for installations of this type will be entertained until such time as the satisfactory operation of this first system has been determined.

STATUS OF FEDERAL WATER POLLUTION CONTROL CONSTRUCTION GRANTS PROGRAM

The 1959 appropriation raises to $140 million Federal funds made available under the 1956 Federal Water Pollution Control Act for grants to municipalities for the construction of needed sewage treatment works.

As of June 30, 1958, Federal grant offers in the amount of $85.3 million had been made to 1038 communities in support of sewage treatment works construction totaling $441.8 million. Applications for an additional $96.5 million in Federal grants from 995 more communities were either in process or being prepared. Total applications approved, in process, or under preparation requested Federal funds 90 per cent in excess of Federal funds appropriated through fiscal year 1958.

Sewage treatment works construction has risen steadily throughout the country since the first grant awards. Construction in calendar year 1958 exceeded the 1952-56 annual average by 40 per cent. The level for fiscal year 1958 was about 20 per cent in excess of that for fiscal year 1957.

An analysis of data available through March 31, 1958, indicates that of the 947 projects approved by that date, nearly 80 per cent involve the construction of new sewage treatment works. These new plants represent the first sewage treatment facilities ever constructed by 523 of the communities, and complete replacement of inadequate facilities in 234 other communities. The remaining 20 per cent provide for plant enlargements, additions, interceptor sewers, and other necessary improvements to existing treatment facilities.

The Public Health Service advises that studies of sanitary engineering design practices, plant operation and maintenance, and construction costs are being carried on concurrently with the administrative phase of the Federal program, to obtain the greatest possible utilization of engineering and construction data for improved sewage treatment works design, construction and

operation. The impact of the grant program on the financing of municipal sewage treatment works is also being continuously evaluated.

STATE CONSTRUCTION GRANTS RECOMMENDED IN NEW HAMPSHIRE

The Fiscal Subcommittee of the New Hampshire Interim Legislative Council, which has been studying the subject of State aid to implement the 30 per cent Federal grants for the construction of municipal sewage treatment works, has given its approval to the proposition in a preliminary report.

The proposed legislation provides that the State will pay up to 20 per cent of the cost of a sewage treatment project and is retroactive to 1947 when the State's comprehensive water pollution control law was enacted. It has been estimated by the New Hampshire Water Pollution Commission that a minimum appropriation of $440,000 will be necessary annually for the next ten years to carry out the provisions of the legislation.

ACID MINE DRAINAGE CONTROL SUBJECT OF INTERSTATE COMMISSION MEETING

Pennsylvania's pioneer work in acid mine drainage control was discussed by representatives of government and industry during a two-day meeting of the Interstate Commission on the Potomac River Basin on May 7 and 8, 1958. The entire meeting was devoted to the control of acid mine drainage. The states of Maryland, Virginia, West Virginia, District of Columbia, and Pennsylvania were represented.

Acid mine drainage is of concern to many areas of Pennsylvania, especially in the 43 counties in which coal is an important industry. The Pennsylvania Sanitary Water Board has approved and in good standing a total of nearly 8,000 individual permits for mine drainage designed to protect the State's clean streams.

EXPERIMENTAL INDUSTRIAL WASTES PERMIT GRANTED FOR EXPLORATORY NATURAL GAS WELL IN LAKE ERIE

Pennsylvania's first exploratory offshore natural gas well, soon to be drilled in Lake Erie, has been granted an experimental industrial wastes permit by the Pennsylvania Sanitary Water Board. The Board in granting the permit to the New York State Natural Gas Corporation of Pittsburgh, set forth certain conditions designed to safeguard against possible pollution from oils, brines or gases that might be encountered in drilling and operation of the well.

Because public water supplies, particularly that of the City of Erie, are drawn from the lake and because the lake is used extensively for navigation, industrial purposes, fishing and other sports, the Board has required that all oils, brines and other polluting material are to be retained and disposed of so as not to escape to the lake waters. Casings, connections and pipe lines are to be free of leaks. Should operations be terminated, the well is to be tightly and permanently capped.

WATER POLLUTION CONTROL ADVISORY BOARD

A meeting of the Federal Water Pollution Control Advisory Board was held in Washington, D. C., on May 15-16, 1958. The Board approved its

report of progress to the President. It also considered progress made thus far in interstate enforcement, industrial relations, major policy decisions of the Public Health Service, and the public awareness program. The Board reiterated its position that the Federal Government has nationwide interest and responsibility in the quality and quantity of water, and that this responsibility includes a national leadership of the highest order, with particular emphasis on research, technical assistance, and consultation. The Board urged the continuing and ever-strengthening of this leadership.

In reviewing legislation introduced in Congress relating to public works, the Board urged that the Surgeon General recommend that legislation relating to waste disposal facilities be vested in the Surgeon General of the Public Health Service to provide an integrated program and avoid duplication of effort. The Board would also favor legislation providing for accelerated tax amortization of industrial waste treatment plants constructed by the industries themselves.

* * *

AIR POLLUTION

NORTH CAROLINA SPONSORS ORIENTATION COURSE IN AIR POLLUTION

A two-day orientation course in atmospheric pollution was the kick-off of North Carolina's clean air inventory. The course was presented by the Institute of Government and the Department of Sanitary Engineering of the University of North Carolina at Chapel Hill in cooperation with the North Carolina State Board of Health. It was attended by some 60 persons including representation from the Division of Sanitary Engineering and the Occupational Health Section of the State Health Department; sanitarians from local health departments; staff members of municipal air pollution control agencies of the state; and representatives from North Carolina industries. Instruction delineated the objectives and procedures which will be followed by a six-month state-wide study to be carried out under a grant with the cooperation of the United States Public Health Service acting with state, county, and municipal officials in Carolina's first clean air inventory which will be completed at the end of 1958, and will contribute valuable information in consideration of the General Assembly in its 1959 session.

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